

Chapter 3

Investigation Methods

Understanding the relationships between people and plants is not an easy task, since many variables can interfere with this relationship. In order to handle this complexity, ethnobotany has used a variety of methods from different scientific disciplines, such as anthropology, botany, ecology, and economics. The vast experience of researchers in ethnobotany has favored the use of methods from other disciplines, considering that the definition of the methods of any science depends on the theoretical conceptions defended by it, as well as the goals of the research.

At first, this diversity of methods and techniques might frighten the reader; however, there are already several published books that compile such methods (see, for example, Alexiades 1996; Martin 1995; Cotton 1996; Cunningham 2001; Albuquerque et al. 2014), which may be important for you to understand the situations where they are typically applied and the advantages and disadvantages of each method. In addition, if you are starting your research in ethnobotany, some basic information about the methods of investigation may be valuable, such as the link between the problem that the research aims to solve and the choice of the most appropriate methods. We want to remind the reader that before choosing the methods, it is necessary to clearly define what you want to investigate and make appropriate, relevant, and meaningful questions, so that the research contributes to scientific knowledge, and not just more data on the same thing. Thus, the reader should keep in mind that instead of designing a survey from the method, it should be designed based on the question it seeks to answer, so that the method chosen will be the one that has the greatest potential to answer the question.

In order to adapt the method to the main problem of a study, for example, the following question should be asked: what is the best way to analyze the problem addressed? This reasoning is fundamental for conducting any scientific research and offers the freedom to use methods compatible with the aims to be achieved, either by giving a quantitative or qualitative emphasis on the research, or by combining both approaches. Thus, novel questions may require new methods. Ethnobotany, due to its potential to encompass a range of research problems, still has great scope for theoretical and methodological innovation. However, one must be cautious in

suggesting new methods of data collection and analysis, as they are often scarcely different from methods previously used, only contributing to inflate procedures.

After considering this basic information, we now intend to present some methods of research used in ethnobotany as a basic introduction to the reader who is beginning in the area. Before presenting the main methods of research, we emphasize two points that, regardless of the methodological tool chosen by the researcher, are crucial for the success of the work: the researcher must (1) establish a relationship of trust with his informants (or partners, collaborators in field) and (2) study the relationship between people and nature from the perspective of those being investigated. The quality of the data collected will depend on the good relationship established with people and the ability of the researcher to become free from judgments when facing the facts observed in the survey.

We will not consider the methodological diversity used in ethnobotany or extend the definitions of these methods, because, as already mentioned, there are specific manuals that fulfill this purpose.

Individual Interviews

Individual interviews are the most common data collection technique in ethnobotanical work. However, it is often mistakenly conceived as an easy application tool. When poorly designed, interviews restrict obtaining reliable data, generating misinformation.

When preparing an interview, the researcher must have knowledge to propose appropriate questions that do not induce answers and are not difficult to answer authentically by people. It is recommended that more open-ended questions are used in which the informant has the freedom to respond according to his or her own logic and concepts, when this is appropriate to the aims of the research. More open-ended questions are especially important in the exploratory stages of research, when the researcher is still unclear about what should be the most important aspects to study on a particular topic. In this case, the respondents' answers may provide *insights* into useful issues to be addressed in the study. In many cases, however, there are situations in which it is appropriate to use closed questions of the dichotomous type (yes/no) or of multiple choice. It is appropriate particularly when the options granted to respondents are the only possible options within a particular scenario (e.g., "have you ever used the plant X" can easily be reduced to "yes" or "no," although a contextualization of this use is recommended in many cases).

Interviews consist mainly of three types: structured, semi-structured, and unstructured. The difference between these interview types is related to the level of flexibility of the questions asked. Thus, in structured interviews, questions are immutable, so you cannot add any new questioning during the search. In semi-structured interviews, there are a series of pre-established questions (guiding), but new questions may arise according to the answers given to the guiding questions. Finally, the unstructured interviews do not have a prior script. Thus, different questions that revolve around a particular theme are asked depending on the context (Figs. 3.1 and 3.2).



Fig. 3.1 The interview is one of the most common techniques of data collection, although not the only one. Credits: Juliana Campos



Fig. 3.2 Dr. Ferreira Júnior (*right*) applying the checklist-interview technique to collect information on medicinal plants. This technique consists on showing images to elicit certain information. Credits: Margarita Paloma Cruz

Participant Observation

In participant observation, a method developed by the Polish anthropologist Bronislaw Malinowski, the researcher needs to be integrated into the study group without being considered an intruder or a stranger. The researcher must share the same habits, including the same foods, to be seen as similar and therefore trustworthy.

However, it is possible to observe that, in many cases, the researcher is never quite seen as “similar,” despite having the intention to absorb the ways of life of a given community. This depends, among other things, on the cultural logic of each community and the personal characteristics of the researcher.

In ethnobotanical inventories, participant observation has the advantage of recording details not made explicit during formal interviews and allows us to catalog the use of species not recorded by forms and questionnaires, especially those that are little used and that end up being forgotten by informants in interview events. However, not many ethnobotanical studies actually apply the technique as it should in fact be applied. Many researchers actually make specific observations and mistakenly call it participant observation.

This method allows an “inside” analysis of the observed reality, allowing us to realize how an individual from a particular culture develops knowledge about the plants of their environment. Thus, any situation in which plants and people find themselves involved can be scrutinized in search of meaning and logic.

In this regard, we recommend reading the *Ethnography Manual* by Marcel Mauss (1993), one of the first theorists of anthropology. This is an extremely useful work combining ethnographic techniques, and the reader can reap important information from its contents (Fig. 3.3).

Free Listing

The free list is considered by some authors as a form of structured interview, with the main goal of recording very specific information about the knowledge of the informants. It consists in asking the informants to list all known items within a cultural domain of research, such as the names of all known medicinal plants. The principle adopted in the analysis of data collected through this technique is that the most culturally important elements will appear more frequently in different lists and will be mentioned in descending order of importance.

Another important aspect of the free list is that, in addition to registering the most important items in a cultural domain, it can be used to determine who the local experts of the studied community are by analyzing the richness of the elements mentioned by each informant, such as the number of useful species mentioned. Like any methodological tool, it presents some limitations, such as forgetting information that is no longer a part of everyday life. Because of this, it is suggested that the



Fig. 3.3 The field observation techniques allow the ethnographic record of activities related to the use of natural resources. In the picture, pequi fruit oil is prepared in the Chapada do Araripe, State of Ceara, NE Brazil. Credits: Juliana Campos

researcher use complementary techniques to enrich the free listings, such as: *new reading*, which is used when a person claims not to remember any more items, and the researcher reads again all that has been said, stimulating the thoughts of items not mentioned above; and *nonspecific induction*, consisting of formulating positive phrases that encourage people to add new plants to the free list when they declare they do not remember any other plant.

One must keep in mind that, even as detailed as the free list is, it is very unlikely that it will be able to capture all the knowledge of the informant on the topic in question. A common example is when we seek to record the known plants to an X domain (e.g., medicinal plants). Even using the common techniques mentioned above to stimulate the informant's memory it is common that, hours or days after the interview, the informants tell us things like "after you left my house I remembered another ten plants or so."

While this may be seen as a limitation, in practice, free lists serve as “indicators” of knowledge or use of resources, in this case of plants, without claiming to capture the knowledge or use in its entirety. Such a full capture would be very difficult to achieve, regardless of the method used. A recent study of our research group (Sousa et al. 2016) has indicated some important limitations of the free listing, which shall be considered by researchers.

Participatory Methodologies

In ethnobotanical studies, it is not always appropriate to choose a data collection method that records people’s individual knowledge in isolation. Depending on the type of problem that is to be responded to with the survey, it is better to adopt methodological procedures that record the knowledge and perceptions of different social actors collectively.

Participatory methods consist of collective meetings held with the different social actors involved in the research, thus enabling the sharing of experiences and moments of self-reflection. The role of the researcher in this process is to act as a facilitator. Based on the theme to be addressed in a participatory workshop,¹ for example, the researcher must didactically organize activities and discussions, contributing to the participation and reflection of all involved.

The use of participatory methodologies is of great importance, because as the participants present their views on an issue of interest to the researcher, they have the opportunity to reflect and get the opinion of other participating members of the activity on the subject. They may thus reformulate concepts that would be informed in a limited way or even wrong in an individual interview event. However, some caution must be taken by intermediaries in participatory methods, since some people tend to be more emphatic than others, which may cause the result to not necessarily reflect the opinion of the majority of the group. Box 3.1 shows an example of an ethnobotanical research that used participatory tools for collecting data (Fig. 3.4).

Triangulation of Methods

Studying the relationship between people and plants is not an easy task. It involves a complexity of factors that place the researcher before a major challenge, still in the initial research planning stage—to choose the most appropriate data collection method.

¹ Participatory workshops should be held in collective spaces that allow dialogue to occur between the different social actors and researchers. Its realization should be well-planned, all informants must receive prior call, and the location of the workshop should be easily accessible to all.

Box 3.1: The Use of the Participatory Method in Ethnobotanical Research: An Example of Research with Rural Communities in Northeastern Brazil

Two rural communities located on the margins of the São Francisco River in Northeast Brazil were studied: Community Ouro Verde (Municipality of Curaçá, Bahia) and Community Jatobá (Municipality of Lagoa Grande, Pernambuco) (Silva et al. 2014). The study raised the following questions: How does the local population perceive the possible changes to riparian vegetation over time? What are the historical events responsible for these changes?

The historical graph was used to record the representations of the population on the possible changes in the abundance of the ten most important plants for the community. Each focal group was encouraged to think about the decline or increase in the availability of plants over three periods: the last 20 years, the last 10 years, and the current period. To represent abundance, ten cards were distributed to be placed in each time period, where ten was the number that represented the maximum abundance of the species.

The timeline was used to capture the historical events perceived in the communities that contributed to landscape modification. The informants were encouraged to discuss the key events responsible for landscape changes in the region in different periods, using the community foundation date as a starting point, to the present time. Within the focal groups, informants were also asked about the changes that occurred in the landscape in each key event and what the consequences were.

Focal groups recognized the occurrence of changes in the availability of most plant species over the last 20 years, indicating plants that increased their availability, either because it was a species with little timber use in the community (*Inga vera* subsp. *affinis*. (DC.) T. D. Penn.), because of its high capacity for regrowth (*Albizia inundata* Mart.) or for being commercially valuable species in the region, where there were incentives for its spread in recent years (*Prosopis juliflora* (Sw.) DC., *Mangifera indica* L.). Additionally, they indicated the occurrence of species that were experiencing population decline in the region, while pointing out those that have always had restricted distribution in the community and that remained with the same abundance of the past. Regarding the timeline, it was possible to record different historical events that occurred in the community and that, according to residents, were responsible for changes in the local landscape, such as the occurrence of floods, large projects of irrigation and mechanization of agriculture, and access to electric energy. All these events were identified as being causes for the decline of riparian vegetation. The population also recognized that local training courses were being offered, which was promoting public awareness and therefore the conservation of species of riparian vegetation.



Fig. 3.4 The picture illustrates the participatory technique of community mapping. The researcher examines a map produced by the community. Credits: Juliana Campos

This step requires time and reflection, because the method chosen determines how precise the data will be in answering the research questions.

More than the task of choosing the research method to be used, ethnobotanists must also make an effort to combine different methods. That's right! It is appropriate that in the same ethnobotanical research, different methods of data collection and analysis are used. This combination is called methodological triangulation.

Why combine more than one methodological tool to answer the same question? We employ this strategy in order to recognize the virtues and weaknesses of each technique. When we use triangulation, we place each method in comparison with another, which maximizes the validity of the results in case they lead to the same conclusions. In turn, if the data obtained by different methods are contradictory, it may be interpreted as a sign that one or both of the methods used have problems. Moreover, the differences in results between the methods employed may mean that such methods are capturing different things, so that the researcher needs to examine which of them is capturing what they actually want to register in the research (Fig. 3.5).

The Importance of Formulating Questions and Hypotheses in Ethnobotanical Research

We have observed that the growth of ethnobotany depends not only on the proper use of methods but also on reflecting upon the hypotheses to be tested and on the theoretical scenarios that the research contributes. Since the 1990s, we have noticed



Fig. 3.5 Sometimes ethnobotanists need to collect ecological data. For this purpose they adopt usual plant ecology procedures. Credits: Juliana Campos

an increase in the number of ethnobotanical studies that use indexes to quantify the knowledge of people in relation to plants. However, the increase in the number of works that apply this quantitative approach has not led to the theoretical growth of the discipline. Many studies mistakenly use such quantitative methods without rigor. It is common to hear from beginners in ethnobotany, or even from experienced researchers, questions such as “What index should I use to value my work?” Notice, readers, that the initial question should be “What is/are my question(s) and hypothesis(es) of research?” and then to ask “What method(s) best fit my question(s) and hypothesis(es)?”.

However, why is the formulation of questions and hypotheses important for the development of ethnobotany? The hypothesis is a statement that indicates a provisional response to the problem or question to be investigated. Whereas the hypothesis is a “temporary” response to a question, it is likely to be overturned (disproved) when the research indicates that it is not valid. Therefore, good hypotheses are those that “resist” the numerous tests (researches), remaining useful to explain certain phenomena.

Both the question and the hypothesis should be connected with the current scientific knowledge. This means that first it is necessary to have knowledge of existing theoretical scenarios in the scientific literature, then to identify possible gaps in these scenarios, that is, problems that science has not answered yet or that need

more information. Thus, from the identification of these gaps, it is possible to identify by means of research questions which of the gaps the research aims to fill.

Based on the question raised, different hypotheses can be formulated. The confirmation or refutation of the hypotheses occurs by conducting a survey that employs a set of appropriate methods to test them. Realize, dear reader, that in this way, the research contributes to the advancement of scientific knowledge by seeking to fill clear knowledge gaps or to solve problems that science has not yet solved. This reasoning should not be different for ethnobotany.

We will provide an example for you to understand the importance of asking questions and hypothesis testing for the development of ethnobotany. However, we are not saying that this is the only path, because the hypothetico-deductive method is just one of the scientific methods employed by scientists to direct their research programs. In 1993, Oliver Phillips and Alwin Gentry published a paper in which they used quantitative techniques to test a set of hypotheses in ethnobotany. Among the hypotheses, the authors sought to test whether the availability of a plant in the environment explains its utilitarian importance, measured by the number of known uses for the species. Testing this hypothesis is important to fill a gap that surrounds our understanding of the relationships between people and plants, and can be expressed by the following question: what factors explain the importance of plants to human groups? To test the mentioned hypothesis, the authors used methods linked to interviews with people from Tambopata, in the Peruvian Amazon, and vegetation sampling methods to access parameters of the vegetation.

Although the work of Phillips and Gentry punctuated the need for hypothesis testing for the theoretical development of the discipline in 1993, much of ethnobotanical studies mentioning the ideas of that work do not contribute to this theoretical necessity (Ramos et al. 2012). This situation corroborates the idea that there are few studies in ethnobotany reflecting on theoretical scenarios and/or performing hypothesis testing.

Thus, dear reader, we leave here the following suggestion: before starting research in ethnobotany consider the theoretical scenario, formulate questions and hypotheses from these scenarios and only after this, define the appropriate methods to test the hypotheses. Consequently, together we will contribute to the theoretical development of this discipline.

Closing this chapter, we present the main rules of ethnobotanical research, making our own the words of Darell Posey (1987) and adding something from our part:

- One should study botany developed by other cultures, bearing in mind that these strive to classify, catalog, and rationally use the plant world
- One should treat informants as experts on the subject, as they truly are, since they possess knowledge of phenomena that are unknown to us and that we only try to understand
- It is necessary to establish friendly and receptive contact with informants, leaving them to be the guides of the research on the identification of cultural categories and the acquisition of theoretical and practical elements

- Data or information should not be rejected, even if at first glance they seem absurd or insignificant, because they may “*contain encodings of evolutionary relationships, or mythological animals, whose function is to protect natural resources and preserve the ecological balance*” (Posey 1987)
- It is always necessary to consult the informants on the permission for the use of equipment (cameras, video cameras and recorders) for the registration of objects, sacred plants, or rituals
- It is necessary to participate without changing the normal course of activities and the behavior of informants, although the presence of the researcher is itself “disturbing”
- One should not impose their own ideas and cultural categories onto informants
- It is necessary to remember that questioning just for the sake of it produces inhibition in the flow of information and that some questions restrict obtaining reliable data—the more open the question, the better, because the informants will be free to respond according to their own logic and their own concepts, which should be taken into consideration when questionnaires, forms, and interviews are used

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